

UNITED STATES DEPARTMENT OF AGRICULTURE  
NATURAL RESOURCES CONSERVATION SERVICE

## DRY HYDRANT

Code 432  
(No.)



### DEFINITION

A non-pressurized permanent pipe assembly system installed into a water source that permits the withdrawal of water by suction.

### PURPOSE

To provide all weather access to an available water source for fire suppression.

### CONDITIONS WHERE PRACTICE APPLIES

Where a dependable source of water is available, where transport vehicles can access the site, and where a source of water is needed for fire suppression.

### CRITERIA

**General Criteria.** All planned work shall comply with all Federal, State, and local laws and regulations.

**Site Conditions.** Site conditions shall be such that an all weather vehicle access is available to the dry hydrant or can be developed. The dry hydrant shall be reasonably close to the water

source to minimize the length of suction line. This should be determined in conjunction with local fire officials. Special care and maintenance will be required when debris and fine soil particles are part of the stream bed. If streams are used, those with sand, gravel, or rock bottoms provide the best operating conditions.

**Water Requirement.** The quantity of water to be considered available to a dry hydrant is the minimum available (at not over 15 feet of total static head) during a drought having an average 50-year (2.0 percent chance) recurrence interval. A minimum water supply of 30,000 gal (1.1 acre-inches of pumpable impoundment water or a minimum pump flow rate of 250 gal per minute without interruption for 2 hours is considered a dependable supply.

**Location.** A location map showing the exact site of the hydrant and vehicle access shall be prepared and furnished to the local fire department with a copy furnished to the landowner. A letter of approval to use the site shall be obtained from the landowner prior to construction. Access, topography, and location should be reviewed by fire department personnel prior to installation.

The fire truck connection shall be within 10 feet of the edge of an all weather access road. The all weather access road and fire truck pumper connection shall be higher than the emergency spillway elevation if installed in a constructed impoundment.

**Water supply.** The adequacy of the water supply shall be determined and documented. The RESOP, SPAW or similar computer programs can be used to determine the water supply contained by earthen construction or water impounding embankments. The adequacy of stream flow source can be determined from regional analysis of stream gage data. Adequacy of pit type ponds

shall be documented based on water budgets, long term water table depths, soil survey data, and experience.

**Access.** Vehicle access to and from the dry hydrant shall be provided for fire truck and pumper units. Access shall have an all-weather surface, be well drained and be at least 12 feet wide for ease of movement by personnel and equipment during an emergency. The access road shall be an all-weather surface in conformance with NRCS conservation practice standard, Access Road, Code 560. The road surface and the surface at the dry hydrant shall provide adequate support for heavy vehicles at all times of the year. A minimum turnaround diameter of 90 feet for the mobile water supply apparatus should be provided where feasible. The access road must be acceptable to the local fire department.

When local road traffic may be involved, an all-weather road surface adjacent to the dry hydrant and completely off the public road is recommended for safety of the emergency personnel and the public. Visibility and sight distances should be considered when locating access roads and pull off areas.

**Pipe.** The pipe material may be iron, steel, or plastic. Pipe shall have watertight joints. Plastic pipe shall be schedule 40, of SDR 26, or stronger. No more than two 90 degree elbows shall be used in the entire pipe system. Pipe shall be 6-inch nominal diameter or larger. The pipe shall be fitted with intake screen or strainer and standard fire truck hose adapters for quick connect/release operations acceptable to the local fire department.

Plastic pipe exposed to light shall be painted or otherwise protected from ultraviolet rays.

The depth at which the pipe is installed shall be below the frost-free depth for the area.

**Pipe Intake.** The pipe intake depth shall be calculated from the design water elevation plus pipe diameter plus 2 feet. The intake screen should have a minimum opening of 4 times the pipe cross sectional area. Where the intake is more than 3 feet off the bottom, a trash rack may be used in lieu of a screen.

A dry hydrant installation shall provide for a positive slope toward the water source. In pits or impoundment's, the intake screen or strainer shall be supported and secured at least two feet above

the pool bottom. The intake shall be at least 4 feet beyond the bottom toe of the earth slope.

To avoid a vortex or whirlpool during pumping, the top of the inlet pipe shall be at least 2.0 feet below the design water level unless a special design is prepared to prevent vortex.

**Pump Lift.** The top of the fire truck connection or centerline of pump (whichever is higher) shall be no more than 15 feet in elevation above the pond or stream water surface after pumping during drought conditions.

The fire truck connection shall be approximately 24 inches above the ground surface, but never higher than the intake of the fire truck.

The total lift (pumping head) shall not exceed 20 feet when all head losses are totaled. Pumping head for each site shall include head loss from screen or strainer, elbows, line friction, elevation (static head) and hard rubber suction hose to the fire truck.

**Dry Hydrant.** Dry barrel (conventional) hydrants may not be used due to excess suction loss and the necessity that they be absolutely airtight.

A recessed hydrant (below ground-level connection) may be specified for use in areas with special needs, such as in a high vandalism area or for low profile and esthetic needs. It is also referred to as a flush mount hydrant and does not require the 24 inch riser. It may be used with the 45° or straight dry hydrant head assembly.

**Dry Hydrant Head.** The hydrant sleeve shall be made of bronze, brass, aluminum alloy or other durable, non-corrosive metal. Sleeve must be permanently affixed inside a PVC head using epoxy adhesive and stainless steel bolts.

The hydrant head shall be able to accept a 6 inch NHT (American National Fire Hose Thread) connection to provide maximum supply. Hydrant (6 inch) head shall conform to ASTM D 2466.

All hydrants shall contain a removable head strainer and stainless steel snap ring that can be removed without special tools. The strainer shall be conical in shape to maximize straining area. All hydrants shall use a rubber "O" ring between the threaded sleeve and PVC head.

**Dry Hydrant Cap.** The cap shall be of snap-on/snap-off design and removable without special tools. It shall be joined with a steel cable or chain and be permanently attached to the dry hydrant

head. The cap shall be hard plastic or of same metal as NHT connection for maximum corrosion resistance.

**Strainer.** The strainer shall be fabricated from PVC material compatible with the pipe. Individual inlet holes shall not exceed 3/8-inch diameter. All components, including pins, shall be non-corrosive. Manufactured well screens shall be corrosion resistant. Screens and strainers shall have a minimum open area of 4 times the pipe cross sectional area.

A strainer may be formed by drilling 1/4 inch to 3/8 inch diameter holes with a minimum of one hole diameter between the holes in PVC pipe. Drill holes shall be deburred and the pipe cleaned before putting the strainer into service. The screens or strainers shall be capped with a removable end cap.

**End Cap.** The end cap must be easily removed without special tools. Perforations are recommended in the end cap, also, to improve flow conditions into the strainer and for jetting action for silt cleanout.

**Materials.** All materials shall meet or exceed the minimum requirements for materials described in the various sections of this standard.

**Testing.** Pipe joint sealants should be given a chance to cure before testing the piping system. A 24-hour time is recommended for PVC pipe. The local fire department shall perform an initial pump test at the design capacity after installation to confirm satisfactory operation. After the initial test, tests should be performed semi-annually. Careful attention should be given to silt, debris, or other interference that may limit the full operation of the hydrant.

**Markings.** The dry hydrant shall be clearly marked in a manner acceptable to the fire department. Use of reflective paint on signs and connection cap will help improve visibility during emergencies. Physical barriers may be needed to protect the above ground pipe system.

**Protection.** After the dry hydrant installation, the site shall be graded for surface drainage and seeded for establishment of vegetation or otherwise protected from erosion. Vegetation shall be in accordance with NRCS conservation practice standard, Critical Area Planting, Code 342.

## CONSIDERATIONS

The dry hydrant will have a minimal effect on the water quality at the site and downstream due to its anticipated infrequent use and low volumes of water pumped when used.

The quality of the water may be impacted due to erosion during construction but should be minimal due to the short construction time. The quality of water could be impacted due to spilled fuels and lubricants by fire trucks using the dry hydrant but should be minimal due to the anticipated infrequent use.

## PLANS AND SPECIFICATIONS

Plans and specifications for each hydrant shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. Required permits shall be obtained prior to initiating any work.

## OPERATION AND MAINTENANCE

Keeping the site clear of obstruction and regular mowing of the dry hydrant access area will be required to keep the area readily available for emergency use.

Pumper testing of the dry hydrant shall be done at least annually to verify site usability. This test shall include back flushing, followed by a pumper test at the maximum designed flow rate. Careful attention should be given to silt, debris, aquatic growth, or other interference that may limit the full operation of the dry hydrant.

Checks of the intake screen should be made once every five years to identify any sediment build up and to provide information for a clean-out operation or for aquatic growth control needs. The hydrant should be back-flushed each spring and fall to remove any silt or debris that may have accumulated on the screen.

## REFERENCES

ASTM D 2466  
NRCS Conservation Practice Standards  
Access Road, Code 560  
Critical Area Planting, Code 342